

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of

1998 Biennial Regulatory Review –
Conducted Emissions Limits Below 30 MHz
for Equipment Regulated under Parts 15
and 18 of the Commission's Rules

)
)
)
)
)
)

ET Docket No. 98-80

RECEIVED & INSPECTED

JUN - 3 2002

FCC - MAILROOM

REPORT AND ORDER
(Proceeding Terminated)

Adopted: May 23, 2002

Released: May 30, 2002

By the Commission:

I. INTRODUCTION

1. By this action, we are amending Parts 15 and 18 of the Commission's rules for radio frequency (RF) devices to modify the limits on the amount of RF energy that is permitted to be conducted onto alternating current (AC) power lines. These limits protect against interference to licensed radio services operating below 30 MHz.¹ The rule changes adopted herein harmonize our domestic requirements with the international standards developed by the International Electrotechnical Commission (IEC), International Special Committee on Radio Interference (CISPR). We believe that such harmonization will benefit consumers and manufacturers by providing better interference protection to licensed radio services as well as promoting a global marketplace for RF devices.

2. We defer the alternative limits and measurement procedures proposed in the *Notice of Proposed Rulemaking*² in this proceeding for carrier current systems (CCS)³ to a future proceeding. We observe that there is substantial development under way of new broadband delivery systems that use power line communication (PLC) technologies. Pending the development of worldwide standards for these new technologies in home communication systems,⁴ and until we adopt new rules, our existing requirements for carrier current systems will continue to apply to these devices.

¹ See 47 C.F.R. §§ 15.107, 15.207 and 18.307 for the conducted emission limits. The regulations also specify radiated emission limits to protect against interference to radio services operating above 30 MHz. In certain cases, the rules specify limits on radiated emissions below 30 MHz. See 47 C.F.R. §§ 15.109(e), 15.209(a) and 18.305.

² See *1998 Biennial Regulatory Review - Conducted Emission Limits Below 30 MHz for Equipment Regulated under Parts 15 and 18 of the Commission's Rules*, ET Docket No. 98-80, *Notice of Proposed Rule Making*, 14 FCC Rcd 18180 (1999).

³ A carrier current system is defined as a system, or part of a system, that transmits radio frequency energy by conduction over the electric power lines to a receiver also connected to the same power lines. See 47 C.F.R. § 15.3(f).

⁴ The IEC CISPR I committee has a task group developing limits and measurement methods for new broadband Power Line Communications technologies.

II. BACKGROUND

3. Parts 15 and 18 of our regulations permit the operation of radio frequency (RF) devices without a requirement to obtain an individual license. Examples of Part 15 devices include those that merely use RF as part of their internal operation, such as personal computers and TV receivers, and devices that generate and transmit generally low level signals such as remote control garage door openers and wireless alarm systems. Part 15 transmitter devices are generally permitted to operate on any frequency, except in designated restricted bands.⁵ All Part 15 devices operate on a non-interference basis to authorized radio services.⁶ Further, Part 15 devices must accept any interference received from other radio operations. Part 18 devices are equipment specifically used for industrial, scientific and medical (ISM) purposes.⁷ Examples of Part 18 equipment include induction cooking ranges, microwave ovens and ultrasonic equipment. All Part 18 devices operate on a non-interference basis to authorized radio services, except that they must operate in frequency bands that have been specifically allocated for Part 18 operations.⁸ In these frequency bands, all other radio services are required to accept any interference received from Part 18 devices. In addition, Part 18 devices are permitted to operate on a non-interference basis on any other frequency, except for certain designated restricted bands.⁹

4. Many Part 15 and Part 18 devices obtain their electrical energy from the AC power lines, *i.e.*, the 110-volt household electrical lines. The RF energy generated by these devices can be conducted back onto the AC power lines. This conducted RF energy can cause harmful interference to radio communications via two possible paths. First, the RF energy may be carried along the electrical wiring to another device that is also connected to the electrical wiring.¹⁰ Second, at frequencies below 30 MHz, where the wavelengths are greater than 10 meters, long stretches of electrical wiring can act as an antenna, permitting the RF energy to be radiated over the airwaves. Due to their low propagation loss at these frequencies, the signals radiating onto the airwaves can cause interference to other services at considerable distances.

5. The potential for harmful interference below 30 MHz from Part 15 and Part 18 devices is controlled by limiting the amount of RF energy that may be conducted onto the AC power lines.¹¹ The current standards for power line conducted emissions for Parts 15 and 18 devices are based largely on limits that were developed in the late 1970s for digital devices.¹² In 1998, the Commission adopted the *Notice of Inquiry (NOI)* in this proceeding to examine whether the regulations for conducted emissions

⁵ See 47 C.F.R. §§ 15.205 and 15.209(a).

⁶ See 47 C.F.R. § 15.5.

⁷ Part 18 devices do not provide communication services; they use RF energy for purposes such as heating materials, etc.

⁸ See 47 C.F.R. §§ 2.106, and 18.301.

⁹ See 47 C.F.R. §§ 18.111, 18.113, 18.117, and 18.803.

¹⁰ This energy may also be conducted into other buildings or homes connected through the same electrical power supply transformer.

¹¹ For most products, conducted emission limits are specified over the frequency range of 450 kHz to 30 MHz. The conducted emission limits for induction cooking ranges and for ultrasonic equipment are specified over the frequency range of 10 kHz to 30 MHz, because these products generate high levels of RF emissions at very low frequencies.

¹² A digital device is an electronic unit that generates and uses timing signals at a rate in excess of 9,000 pulses (cycles) per second and uses digital techniques; or generates and uses radio frequency energy for the purpose of performing data processing functions. See 47 C.F.R. § 15.3(k).

continue to be necessary and, if so, whether any change to the limits is appropriate.¹³ Upon review of the comments filed in response to that *NOI*, the Commission issued the *Notice of Proposed Rule Making (Notice)* in this proceeding.

6. In the *Notice*, the Commission proposed several changes to its regulations for line conducted emissions from Parts 15 and 18 devices. It proposed to amend the conducted emission limits for such equipment to make them generally consistent with the international standards specified in IEC/CISPR Publications 11 and 22.¹⁴ The differences between the limits in the rules and the CISPR limits are discussed, *infra*.¹⁵ The CISPR limits, including the limits on conducted emissions below 450 kHz, would be applied to all Part 15 devices, to all induction cooking ranges and ultrasonic equipment operating under Part 18, and to all consumer Part 18 devices, including microwave ovens.¹⁶ The Commission proposed to provide a transition period of one year for all new Part 15 and 18 devices subsequently authorized under a grant of Certification, a Declaration of Conformity, or Verification.¹⁷ It also proposed to require all products, imported or manufactured three years after the effective date of the new rules, to comply with these standards.

7. In addition to the changes to the conducted emission limits, the Commission proposed an alternative measurement procedure for Part 15 intentional radiators operating below 30 MHz, *e.g.*, carrier current systems (CCS), which would permit a demonstration of compliance with applicable radiated emission limits instead of conducted limits.¹⁸ The Commission also proposed to clarify Section 15.109(e) of its rules to require measurements of radiated emissions below 30 MHz for Part 15 unintentional radiators only when the length of the connecting cable carrying the RF signal is either at least one-fourth of

¹³ See 1998 Biennial Regulatory Review - Conducted Emission Limits Below 30 MHz for Equipment Regulated under Parts 15 and 18 of the Commission's Rules, ET Docket 98-80, *Notice of Inquiry*, 13 FCC Rod 12955 (1998).

¹⁴ See *Notice* at ¶ 24. IEC/CISPR 22 addresses conducted and radiated standards for information technology equipment, *i.e.*, digital devices. IEC/CISPR 11 addresses conducted and radiated standards for Industrial, Scientific and Medical (ISM) equipment.

¹⁵ See ¶ 12.

¹⁶ Conducted emission limits currently apply to all Part 15 devices, except where provided for in § 15.103. However, such limits only apply to the following products operating under Part 18: RF lighting devices, ultrasonic equipment and induction cooking ranges. The Commission proposed, in the *Notice*, to expand the applicability of the conducted limits to include all Part 18 consumer devices, including microwave ovens.

¹⁷ *Verification* is a procedure where the manufacturer makes measurements or takes the necessary steps to insure that the equipment complies with the appropriate technical standards. See 47 C.F.R. § 2.902. A *Declaration of Conformity* is a procedure where the responsible party, as defined in § 2.909, makes measurements or takes other necessary steps to ensure that the equipment complies with the appropriate technical standards. See 47 C.F.R. § 2.906. *Certification* is an equipment authorization issued by the Commission or its designated entities, based on representations and test data submitted by the applicant. See 47 C.F.R. § 2.907.

¹⁸ See *Notice* at ¶ 26. An intentional radiator is a device that intentionally generates and emits RF energy by radiation or induction. See 47 C.F.R. § 15.3(o). It has been found to be difficult, while making conducted emissions measurements, to suppress emissions appearing at the fundamental frequency of the transmitter, due to coupling between the antenna and the power wiring. To alleviate this burden, the Commission proposed to permit the responsible party to ignore the level of the emissions conducted onto the AC power lines at the transmitter's fundamental emission, provided the responsible party includes the energy radiated from the AC power lines as part of the total radiated emissions.

the wavelength of the center frequency of the signal, or is of unknown length.¹⁹ Comments were also requested on whether voltage and current limits on RF signals placed on the AC power line could be employed by CCS devices as an optional method of demonstrating compliance with the radiated limits outside of the AM broadcast band.²⁰

8. In response to the *Notice*, eleven parties filed comments and seven parties filed reply comments. A list of commenting parties is shown in Appendix B.

III. DISCUSSION

9. Based on the comments filed in response to the *Notice*, we are adopting changes to the rules for power line conducted emissions to make them more effective in controlling interference to communications services and to reduce the burden of these regulations.²¹ Specifically, we are amending the conducted emission limits to make them consistent with international CISPR standards. We are also adopting conducted emission limits for Part 18 consumer products, such as microwave ovens, that are currently subject only to radiated emission limits. These limits are consistent with the requirements that already exist for certain types of ISM consumer products, such as ultrasonic denture and jewelry cleaners. Finally, we are establishing transition provisions for implementing the new CISPR limits. Harmonizing our rules with international standards will allow manufacturers to produce products for distribution in several markets without any modification, thus reducing costs. This harmonization will be particularly beneficial to small business entities that have limited resources to maintain separate product lines in order to ensure compliance with region or country-specific requirements. Moreover, this will enhance the value of Mutual Recognition Agreements (MRA)²² for U.S. manufacturers, thereby promoting the growth and international expansion of U.S. industries.

10. The proposal for an alternative measurement procedure for intentional radiators operating on frequencies below 30 MHz and the request for comments to improve the existing testing methodologies and requirements for intentional RF signals transmitted on power lines²³ drew a number of observations and suggestions.²⁴ However, we note that there is substantial development under way of new broadband

¹⁹ An unintentional radiator is a device that intentionally generates RF energy for use within the device, or that sends RF signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or conduction. See 47 C.F.R. § 15.3(z). When the connecting cables in such devices are so short that they cannot act as an effective antenna, radiated emission measurements below 30 MHz may be unnecessary. See *Notice* at ¶ 32.

²⁰ Carrier current systems are not subject to conducted emission limits except in the AM broadcast band between 535 and 1705 kHz, however, they are required to meet the general radiated emission limits. The standards for carrier current systems are contained in 47 C.F.R. §§ 15.107(c), 15.109(e), 15.207(c), 15.209(a) and 15.221.

²¹ The harmonization of standards facilitates the acceptance of test results between countries, and reduces the compliance costs by eliminating duplicative testing.

²² A Mutual Recognition Agreement (MRA) is a government-to-government agreement that allows products such as telecommunications equipment produced for export to be tested and certified in the United States as meeting an export market's requirements before it is shipped. Since the agreement is "mutual", the MRA also allows imports to be tested and certified overseas to U.S. requirements for sale in the U.S. market. MRAs do not require the harmonization of standards; however, harmonized requirements can reduce the number of compliance tests needed, thus eliminating duplicative testing.

²³ See *Notice* at ¶ 32.

²⁴ For example, Microsoft Corporation (Microsoft) suggested an alternative procedure of calculating the radiated emission levels (see Microsoft comments at 2) and Adaptive Networks, Inc. (Adaptive) proposed a laboratory test (continued....)

delivery systems that use power line communication technologies. We also note that the IEC/CISPR I committee has established a Task Group to develop limits and methods of measurements for these new technologies. Therefore, in order to allow for a better informed and more complete decision, we are deferring to a further proceeding the consideration of new limits and measurement procedures for CCS devices. We intend to monitor these activities to ensure that future proposed test procedures and limits are harmonized with international standards and would not create an additional testing burden on manufacturers of such equipment. Pending the adoption of new rules based on the international work, our existing requirements for carrier current systems continue to apply to all such devices.²⁵

A. Harmonization with IEC/CISPR Conducted Emission Limits

11. In the *Notice*, the Commission observed that considerable work has been done to develop conducted emission standards within the CISPR. Notably, CISPR has developed standards for information technology equipment under CISPR Publication 22,²⁶ and for industrial, scientific and medical (ISM) equipment under CISPR Publication 11. The Commission also noted that there appears to be growing support by both governments and industry for the harmonization of emission standards internationally to promote trade and competition. Harmonized standards can improve economies of scale and thereby reduce costs, to the benefit of consumers. Harmonized standards also tend to reduce testing costs for products marketed internationally.

1. Harmonization with CISPR Publication 22 Limits

12. The Commission therefore proposed to apply the limits of CISPR Publication 22 to all Part 15 devices that are currently subject to line conducted emission limits.²⁷ The Commission noted that the existing Part 15 limits are based on quasi-peak measurements, but allow a correction for broadband emissions in order to take into account averaging factors.²⁸ On the other hand, CISPR Publication 22 specifies separate limits for quasi-peak and average measurements. Adjustments for broadband emissions have already been incorporated into the CISPR limits; therefore, the CISPR quasi-peak limit values are less restrictive than the limits currently in the rules. After taking these factors into account, the CISPR emission limits are slightly more stringent than the current rules below 5 MHz and are approximately equivalent to the current rules above 5 MHz. The Commission also noted that, for many years, Part 15 has provided the option of complying with either the limits in the rules or the CISPR 22 limits.²⁹ Due to this

(Continued from previous page)

procedure for measuring radiated emissions from carrier current and other wired systems (see Adaptive comments at 3-5).

²⁵ The standards for carrier current systems are contained in 47 C.F.R. §§ 15.107(c), 15.109(e), 15.207(c), 15.209(a) and 15.221.

²⁶ See 47 C.F.R. § 15.107(e).

²⁷ Under Part 15, incidental radiation devices and digital devices falling under the exemption in 47 C.F.R. § 15.103 are not subject to the line conducted emission limits. An incidental radiator is a device that generates RF energy during the course of its operation although it is not intentionally designed to generate or emit RF energy. See 47 C.F.R. § 15.3(n). Examples of incidental radiators include electric motors, light switches, etc.

²⁸ The measurement procedure allows the instrument readings for broadband emissions to be reduced by 13 dB for comparison to the FCC quasi-peak limits. See 47 C.F.R. § 15.207(b). Since CISPR standards specify separate limits for quasi-peak and average measurements, with the adoption of the CISPR limits, this option of the 13 dB reduction is removed.

²⁹ See 47 C.F.R. § 15.107 (e).

practice, many manufacturers' products already comply with the CISPR limits.³⁰ Therefore, the use of a single set of limits would simplify the rules and promote harmonization, without generally causing an undue burden on manufacturers.

13. In general, the comments support the Commission's proposal to adopt the IEC/CISPR standards.³¹ AHAM endorses the Commission's efforts to harmonize its conducted emission limits with the standards developed by the CISPR.³² CEA agrees with the Commission's views that developing consistency with the international standards will promote a global marketplace, which will help reduce costs for manufacturers and consumers.³³ ITI states that the proposed changes to use the international standards are in line with its objectives.³⁴ Lucent applauds the Commission's efforts to harmonize domestic and international regulatory requirements and encourages the Commission to continue this process.³⁵ Intel recognizes that changing the limits in Part 15 to agree with those in CISPR 22 is a proper step toward harmonizing the FCC limits from digital devices with the widely accepted international standards for electromagnetic emissions.³⁶ Specific objections were received from the American Radio Relay League (ARRL), the National Association of Broadcasters (NAB) and the American National Standards Institute, Inc., Accredited Standards Committee C63 (C63), which are addressed below.

14. We continue to believe that the harmonization of our conducted emission limits in Part 15 with the limits in CISPR 22 will foster trade and facilitate the growth of U.S. businesses by reducing costs for manufacturers and consumers. After reviewing all the comments received in this proceeding, we are adopting the CISPR 22 conducted emission limits for all Part 15 equipment that are currently subject to the conducted emissions requirements.³⁷ The limits being adopted and the changes to the appropriate sections of our rules are shown in Appendix C.

15. The ARRL states that it disagrees with any liberalization of limits for broadband emissions that may result from the use of RF lighting devices.³⁸ We note, as discussed *supra*, that the emission standards for RF lighting devices were reviewed in a separate proceeding and are not being addressed here.

16. The NAB supports generally tighter power line conducted emission limits based on technical studies submitted by EMC Compliance.³⁹ It also requests more stringent limits in the AM broadcast band (535 to 1705 kHz) to prevent interference between devices belonging to the same user who may have only

³⁰ See comments of Intel Corporation (Intel) at 2. Most products are already tested to the limits contained in CISPR 22 due to the international nature of the marketplace.

³¹ See, for example, the comments of the Association of Home Appliance Manufacturers (AHAM), the Consumers Electronics Association (CEA), the Information Technology Industry Council (ITI), Intel, Lucent Technologies Inc. (Lucent), and the U.S. Department of Transportation (DOT).

³² See comments of AHAM at 3-4.

³³ See comments of CEA at 2.

³⁴ See comments of ITI at 6.

³⁵ See comments of Lucent at 1.

³⁶ See comments of Intel at 2-3.

³⁷ Conducted emission limits are specified in 47 C.F.R. §§ 15.107 and 15.207.

³⁸ See comments of ARRL at 7.

³⁹ EMC Compliance submitted test results in response to the NOI.

one outlet to connect them.⁴⁰ NAB advocates the elimination of the distinction between Class A and Class B digital devices, retaining only the more stringent Class B limits.⁴¹ It further recommends the elimination, or the significant modification, of the exemptions in Section 15.103 for certain digital devices because NAB believes they create situations where limits are applied to part of a device but not to the rest of it, such as the exemption on the digital control circuitry used in microwave ovens.⁴²

17. We are not persuaded by NAB's arguments for tightening the conducted emission limits in the AM broadcast band. In the *Notice*, we observed that our interference standards are designed principally to control interference from a user's device to other users of the spectrum, *e.g.*, from a user's personal computer to a neighbor's AM broadcast reception.⁴³ Our Part 15 standards are generally less directed towards controlling interference between devices within a user's immediate premises, *e.g.*, from the user's personal computer to an AM broadcast receiver sitting on the same desk and connected to the same electrical outlet. This approach recognizes that consumers can take steps to control interference between closely spaced devices under their control. We observe that the CISPR standards will generally require reduced emissions in the AM broadcast band, which would address some of NAB's concerns.

18. We also note that the international CISPR line conducted emission standards include separate limits for equipment used in business/industrial (Class A) and residential (Class B) environments. Such an approach is appropriate, because it takes into account the different characteristics affecting interference in each environment, such as the wider separation distances between equipment which occur in business and commercial environments. We believe that the international standards strike a reasonable balance between the need to establish standards to control interference to broadcasting services in the under 30 MHz region of the spectrum, and the need to avoid placing unnecessary constraints on RF devices and ISM equipment. As noted by IMPI, NAB's suggestions of a single class of equipment would put the U.S. in disharmony with the rest of the world.⁴⁴ Therefore, we are retaining the definitions of Class A and Class B digital devices, as currently specified in our rules, as necessary in the public interest.

19. In the *Notice*, we remarked that the rules exempt incidental radiators and certain digital equipment from the line conducted emission limits.⁴⁵ In particular, exemption from specific emission limits is provided for incidental radiators such as electric motors, hair dryers, washing machines, etc.; digital devices used exclusively as an electronic control of power system used by a public utility or an industrial plant; digital devices used exclusively as industrial, commercial, or medical test equipment; digital devices used in appliances; and specialized medical digital devices. We noted that, given the large numbers of incidental radiators that would be affected and the overall lack of interference complaints from such devices, mandatory emission limits are not warranted for these devices. With regard to NAB's comments, we observe that the rules exempt the digital control circuitry in devices such as microwave ovens only when this circuitry is used to enable operation of the device.⁴⁶ In addition, a microwave oven does not fall under

⁴⁰ See comments of NAB at 4.

⁴¹ See ¶ 17 for the distinction between Class A and Class B.

⁴² See 47 C.F.R. § 15.103 and comments of NAB at 4. NAB argued that limits are placed on the microwave-generating circuitry and other non-digital circuitry in the oven, but not on the digital control circuitry which is exempt. NAB's comments on this issue are addressed in ¶ 18.

⁴³ See *Notice* at ¶ 23.

⁴⁴ See reply comments of IMPI at 4.

⁴⁵ See 47 C.F.R. § 15.103.

⁴⁶ See 47 C.F.R. § 15.3(k). A radio frequency device that is specifically subject to an emanation requirement in any other rule part or an intentional radiator subject to Subpart C of Part 15 that contains a digital device is not (continued....)

the definition of a digital device in Part 15 because it is covered under Part 18 of our rules. We further find no information or evidence in the record that warrants removing or modifying the existing exemptions at this time; therefore, we do not agree with NAB that all of the exemptions for digital devices should be eliminated. Accordingly, we will retain the exemptions in 47 C.F.R. § 15.103, as necessary in the public interest.

20. Harmonization of our rules with the CISPR 22 rules will extend the conducted emission limits from the existing lowest frequency of 450 kHz down to 150 kHz. C63 objects to our proposal to extend the frequency range down to 150 kHz and recommends making the limits in the 150-450 kHz range optional. C63 states that the suppression of emissions in this range is particularly onerous for switch-mode and transformer-rectifier power supplies.⁴⁷

21. We find that extending the limits to frequencies below 450 kHz is warranted to protect existing, new, and expanded future uses for this region of the spectrum. While there are several types of radio systems operating below 450 kHz, we are particularly concerned about the potential for harmful interference to licensed radio services that are employed for applications involving safety of life and property, such as the Differential Global Positioning System (DGPS).⁴⁸ DOT cites several governmental entities, besides itself, such as the US Coast Guard (USCG) and the Federal Railroad Administration (FRA), that are using or planning to deploy navigational systems using DGPS with frequencies between 285 and 325 kHz. DOT further advocates the protection of radio-beacons that are used as backup to more sophisticated radio-navigation systems in the 190-435 kHz.⁴⁹ We therefore believe that the adoption of conducted requirements below 450 kHz will not only provide the benefits of international harmonization, but will protect radio services used by systems providing navigation to safety-of-life transportation operations at sea, in the air, and on land.⁵⁰

2. Harmonization with CISPR Publication 11 Limits

22. In the *Notice*, the Commission proposed to apply the limits of CISPR Publication 11 to all Part 18 induction cooking ranges and ultrasonic equipment.⁵¹ We further proposed to require all consumer ISM devices to comply with the conducted emission limits in CISPR Publication 11.⁵² We observed that our current Part 18 rules are inconsistent with regard to the treatment of consumer ISM equipment. For example, ultrasonic devices such as denture and jewelry cleaners are subject to conducted emission limits, but devices such as microwave ovens are not, yet microwave ovens can generate 1000 watts or more of RF energy and are known to conduct significant levels of RF energy onto the power lines. We were also concerned that new consumer ISM devices may be developed that would not be subject to any conducted emission limits under the current rules. In addition, we specifically excluded consideration of conducted

(Continued from previous page)

subject to the standards for digital devices, provided the digital device is used only to enable operation of the radio frequency device and the digital device does not control additional functions or capabilities.

⁴⁷ See comments of C63 at 1.

⁴⁸ See comments of DOT at 2.

⁴⁹ See comments of DOT at 3.

⁵⁰ See comments of DOT at 1-2.

⁵¹ See 47 C.F.R. § 18.307. Currently in Part 18, conducted emission limits apply only to RF lighting devices, induction cooking ranges and ultrasonic equipment. Part 18 also exempts from the emission standards all non-consumer ultrasonic and magnetic resonance equipment used for medical diagnostic and monitoring applications. See 47 C.F.R. § 18.121.

⁵² See *Notice* at ¶ 29.

emission limits for RF lighting devices from this proceeding, as they are being reviewed separately.⁵³

23. Our existing conducted emission limits for Part 18 cover the frequency range from 10 kHz to 30 MHz.⁵⁴ The CISPR Publication 11 specifies conducted emission limits from 9 kHz to 30 MHz. In the *Notice*, we proposed to harmonize the limits in Part 18 with those specified in CISPR 11. The current limits in Part 18 are based on average measurements, except those for RF lighting equipment. CISPR 11 specifies separate limits for quasi-peak and average measurements.⁵⁵ The CISPR 11 limit values are somewhat comparable to the FCC limits over the frequency range from 150 kHz to 30 MHz.⁵⁶ We indicated that, given the international nature of the marketplace, the use of a single set of limits would simplify the rules and promote harmonization, without causing undue burden to manufacturers.

24. IMPI supports the concept of harmonizing ISM regulations for uniformity in national and international standards, however it states that the history of interference complaints fails to support any argument that a significant interference problem exists.⁵⁷ AHAM also supports the Commission's efforts to harmonize its conducted limits with the CISPR limits.⁵⁸ ARRL states that the Commission's proposal will reduce manufacturers' costs, foster a global market for unlicensed and ISM devices, and somewhat reduce the increasing levels of interference to communications services, including the Amateur Service.⁵⁹

25. We agree with the commenting parties that the harmonization of our conducted emission limits in Part 18 with the limits in CISPR 11 will foster trade, facilitate growth and international expansion of U.S. businesses and reduce costs, to the benefit of manufacturers and consumers. We also believe that the adoption of conducted emission limits for all consumer ISM equipment, including microwave ovens, will promote consistency and uniformity with regard to the treatment of these products. We note that the adoption of the CISPR rules in this proceeding is not based on a response to interference issues, but rather, to promote a global market and harmonization of requirements, which will benefit manufacturers and consumers. Accordingly, we are adopting the conducted emission limits in CISPR 11 for Part 18 ultrasonic equipment and induction cooking ranges, and for Part 18 consumer devices.⁶⁰ The limits being adopted and the changes to the appropriate sections of our rules are shown in Appendix C.

⁵³ See *In the Matter of 1998 Biennial Regulatory Review – Amendment of Part 18 of the Commission's Rules to Update Regulations for RF Lighting Devices*, ET Docket No. 98-42, *First Report and Order*, 14 FCC Rcd 9840 (1999).

⁵⁴ See 47 C.F.R. § 18.307. Emissions limits from 10 kHz only apply to certain ISM devices, e.g., induction cooking ranges and ultrasonic equipment, because these products generate high levels of RF emissions at very low frequencies.

⁵⁵ CISPR 11 specifies average limits only above 500 KHz for induction cooking and ultrasonic equipment; however, it does specify quasi-peak limits for this equipment from 9 kHz to 30 MHz. Both limits are mandatory.

⁵⁶ For example, as compared to the FCC limit, the CISPR 11 average limit for ultrasonic equipment in the vicinity of the AM broadcast band (535 to 1705 kHz) is approximately 10 dB more stringent at 500 kHz, 5 dB more stringent at 1 MHz and 2 dB more stringent at 2 MHz. However, the CISPR limit is 4 dB less stringent than the FCC limit above 5 MHz for the same equipment. These figures took into account the differences in the Line Impedance Stabilization Networks (LISN) specified in each standard. See ¶ 26.

⁵⁷ See comments of IMPI at 2.

⁵⁸ See comments of AHAM at 2.

⁵⁹ See comments of ARRL at 10.

⁶⁰ Conducted emission limits are specified in 47 C.F.R. § 18.307.

26. We further note that CISPR 11 specifies the use of a 50 μ H/50 Ohm LISN⁶¹ for Part 18 ultrasonic and induction cooking equipment rather than the 5 μ H/50 Ohm LISN previously specified in the rules.⁶² CISPR 11 refers to CISPR 16:1999, Figure 7a, for the impedance curve of the LISN to be used in carrying out the measurements against the specified limits.⁶³ Accordingly, we are modifying the rules to require a 50 μ H/50 Ohm LISN with this impedance curve to be used in determining compliance with Part 18 conducted emission limits for ultrasonic and induction cooking equipment.⁶⁴

B. Transition Provisions

27. In the *Notice*, the Commission proposed to require that all newly authorized Part 15 and 18 devices be subject to the new line conducted regulations effective one year from the date of publication of the Report and Order in the Federal Register.⁶⁵ It also proposed that these new regulations would apply to all Part 15 and 18 devices that are imported or manufactured on or after three years from the date of publication of the Report and Order in the Federal Register, regardless of when the products were initially authorized. The Commission expressed its belief that most affected products would be redesigned within this three-year time frame in the course of normal product cycles and that compliance with this proposal therefore would not cause an unreasonable burden on industry.

28. Lucent and DOT fully support the proposed transition provisions.⁶⁶ IMPI states that, due to the technical differences in the national power grids, there are two different UL standards, one used for products destined for domestic marketing and a second for products intended for European and other foreign markets.⁶⁷ IMPI states that it will need more than one year to bring its existing products into compliance with one standard. Similarly, CEA states that the one-year transition provision for new products is unreasonable and burdensome to manufacturers and consumers and that the time necessary to complete design or redesign and testing of a product cannot be accomplished within one year.⁶⁸ It recommends that the transition period for new products be extended to three years and that products already authorized as being in compliance with the existing regulations be grandfathered indefinitely. IMPI supports CEA's request to extend the transition provision to three years for new products and to indefinitely grandfather existing products.⁶⁹ It adds that while many products would be redesigned in three years, others have much longer product life cycles.

⁶¹ A Line Impedance Stabilization Network (LISN) is an artificial AC power line network that provides a specified load impedance in a given frequency range. It is used to isolate the equipment from the AC supply and to facilitate measurements.

⁶² See *Notice* at ¶ 24 and Appendix C.

⁶³ See CISPR 16-1:1999, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1: Radio disturbance and immunity measuring apparatus*, Figure 7a, at 301.

⁶⁴ Figure 1 in ANSI C63.4-2000 shows essentially the same impedance curve as CISPR 16.

⁶⁵ See *Notice* at ¶ 34.

⁶⁶ See comments of Lucent at 2 and DOT at 3.

⁶⁷ See comments of IMPI at 3.

⁶⁸ See comments of CEA at 3-4.

⁶⁹ See reply comments of IMPI at 2-3. IMPI, in its comments at 4, originally requested a three-year transition period for new products and a five-year transition period for existing products.

29. AHAM states that the proposed compliance deadline of one year could impose undue economic burden on microwave oven manufacturers and their customers.⁷⁰ It requests that a single three-year transition provision be established for new and existing models of microwave ovens, because it must install filters that would represent a substantial proportion of the manufacturer's cost for each oven, in order to comply with the new AC power line conducted limits. AHAM states that its members have adapted some of their manufacturing operations and facilities to comply with the lower CISPR conducted limits that are now in effect in Canada and in Europe. However, a portion of its members' manufacturing operations have not been engineered to meet the CISPR limits because they serve only the U.S. markets and other markets where CISPR standards are not yet in place.⁷¹

30. ITI objects to the transition provisions with regard to the need to comply with the CISPR standards on conducted emission limits below 450 kHz.⁷² It states that having to comply with conducted limits below 450 kHz would add cost to products; some products now on the market will not comply with these standards; and there is no evidence that continued manufacture or importation of these products would cause harmful interference. Accordingly, ITI requests that existing products be grandfathered indefinitely.

31. We are sympathetic to the concerns expressed by manufacturers of microwave ovens and other products regarding the impact that compliance with the new line conducted emission rules will have on new and existing product models. While it appears that complying with these limits will not pose a significant burden on many, if not most, manufacturers, given that they have already modified their products to allow them to trade in Canada and Europe, there are cases where the new rules will have an impact. Inasmuch as there is no evidence of interference problems from Part 15 and Part 18 devices that comply with the existing line conducted emission limits, we also believe that extending the transition period for a modest amount of time would not pose serious risks of new interference. We therefore will provide an additional one year of transition period for new product models beyond that proposed in the *Notice*. In view of the interference concerns expressed by DOT,⁷³ we do not agree that existing product models should be grandfathered indefinitely. Accordingly, we are adopting transition provisions for compliance of Part 15 and Part 18 devices with the new conducted emission limits as follows: the rules will apply to all new products authorized under Parts 15 and 18 of the rules on or after two years from the date of publication of this Report and Order in the Federal Register and will apply to all existing products authorized under Parts 15 and 18 of the rules that are manufactured or imported on or after three years from that date.

C. Miscellaneous Issues

32. *Conducted emissions measurements.* The ARRL requests clarification of the conducted emissions limits with respect to common mode versus differential mode.⁷⁴ It states that while typical measurement techniques examine differential mode signals, some devices can generate common-mode conducted emissions as well.⁷⁵ ARRL requests that the Commission clarify that both common-mode and differential-

⁷⁰ See comments of AHAM at 2-6.

⁷¹ See comments of AHAM at 6.

⁷² See comments of ITI at 3-5.

⁷³ See comments of DOT at 1-2.

⁷⁴ See comments of ARRL at 4.

⁷⁵ *Differential mode* signals flow between two conductors in a pair with no ground reference. *Common mode* signals are in phase in each conductor of a multi-wire cable, with the return path through some common conductor, usually earth ground. See The American Radio Relay League, *RFI Book* (1999).

mode emissions are regulated and tested for compliance. We note that the measurement standards for conducted emission limits in our rules follow the methods prescribed in ANSI C63.4-1992,⁷⁶ which specify measurements on each conductor with respect to ground, a common-mode measurement. Furthermore, there is no evidence in the record of problems with the current methods, nor did ARRL provide substantiated data on the subject. Accordingly, we decline to modify our current rules with regard to test methods on conducted emissions at the present time.

33. *Restricted bands.* Currently, Section 15.205 of the rules prohibits intentional radiators from emitting any RF signals, other than spurious emissions, within certain designated "restricted" bands.⁷⁷ In its comments, the ARRL requests that we amend Section 15.205 to indicate that spurious emissions do not include out-of-band emissions that are located within 250 percent of the necessary bandwidth. ARRL also requests that the prohibition against operating within the restricted bands also applies to unintentional radiators that conduct signals over wires, such as carrier current systems.⁷⁸ Adaptive objects to ARRL's proposal, noting that it would be virtually impossible for certain equipment designs to comply with the restricted band provisions.⁷⁹ The ARRL's requests to expand the application of the restricted bands to all emissions from intentional radiators that are within 250 percent of the necessary bandwidth and to apply the restricted bands to unintentional radiators are outside of the scope of this proceeding; therefore, we are not addressing them herein.

IV. PROCEDURAL MATTERS

34. *Final Regulatory Flexibility Analysis.* The Final Regulatory Flexibility Analysis, required by Section 603 of the Regulatory Flexibility Act, as amended by the Contract with America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996), is contained in Appendix A.

35. *Paperwork Reduction Act Analysis.* This *Report and Order* does not contain any new or modified information collection(s) subject to the PRA of 1995, Public Law 104-13.

36. For further information regarding this *Report and Order*, contact Anh Wride, Office of Engineering and Technology, (202) 418-0577.

⁷⁶ See 47 C.F.R. § 15.31.

⁷⁷ See 47 C.F.R. § 15.205.

⁷⁸ See comments of ARRL at 6.

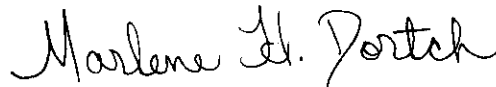
⁷⁹ See reply comments of Adaptive at 3.

V. ORDERING CLAUSES

37. IT IS ORDERED that Parts 15 and 18 of the Commission's Rules and Regulations ARE AMENDED as specified in Appendix C, [effective 60 days after publication in the Federal Register.] This action is taken pursuant to Sections 4(i), 301, 302, 303(e), 303(f), 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i), 301, 302, 303(e), 303(f), and 303(r).

38. IT IS FURTHER ORDERED that the Commission's Consumer & Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Report and Order*, including the Final Regulatory Flexibility Analysis in Appendix A, to the Chief Counsel for Advocacy of the Small Business Administration. A copy of this *Report and Order* and FRFA (or summaries thereof) will also be published in the Federal Register.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary

APPENDIX A

FINAL REGULATORY FLEXIBILITY ANALYSIS

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),⁸⁰ an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Notice of Proposed Rule Making (NPRM), 1998 Biennial Regulatory Review – Conducted Emissions Limits Below 30 MHz for Equipment Regulated under Parts 15 and 18 of the Commission's Rules*.⁸¹ The Commission sought written public comment on the proposals in the *NPRM*, including comments on the IRFA. The Final Regulatory Flexibility Analysis (FRFA) in this *Report and Order* conforms to the RFA.⁸²

A. Need for, and Objectives of, the *Report and Order*

By this action, the Commission amends Parts 15 and 18 of the rules for radio frequency (RF) devices regarding the amount of RF energy that is permitted to be conducted onto the alternating current (AC) power lines. The purpose of the present limits is to protect against interference to radio services operating below 30 MHz. By the rules adopted herein, these limits are harmonized by incorporating the limits of the international standards developed by the International Electrotechnical Commission (IEC), International Special Committee on Radio Interference (CISPR) into the rules.⁸³ The Commission anticipates that such harmonization will provide better interference protection to licensed radio services as well as promoting a global marketplace for RF devices, thereby reducing costs for manufacturers and consumers. Most manufacturers are already performing testing to the requirements of the international standards on products sold in the U.S. that are also marketed in regions that have adopted the CISPR standards. Therefore, testing to these limits does not represent a significant burden. Harmonization of our rules with the international standards will allow the same product to be manufactured and marketed without modifications in several countries, thereby enabling economies of scale, which would reduce costs. The comments overwhelmingly support our harmonization action.

B. Summary of Significant Issues Raised by Public Comments In Response to the IRFA

There were comments on the *NPRM*, but there were no specific comments addressing small business issues in response to the IRFA.

C. Description and Estimate of the Number of Small Entities To Which Rules Will Apply

The RFA directs agencies to provide a description of and, where feasible, an estimate of the

⁸⁰ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

⁸¹ See *1998 Biennial Regulatory Review - Conducted Emission Limits Below 30 MHz for Equipment Regulated under Parts 15 and 18 of the Commission's Rules*, ET Docket No. 98-80, *Notice of Proposed Rule Making*, 14 FCC Rcd 18180 (1999), at 16.

⁸² See 5 U.S.C. § 604.

⁸³ The International Special Committee on Radio Interference (CISPR) was established in 1934 by a group of international organizations to address radio interference. CISPR is a non-governmental group composed of National Committees of the International Electrotechnical Commission (IEC), as well as numerous international organizations. The IEC is the international standards and conformity assessment body for all fields of electrotechnology.

number of small entities that may be affected by the proposed rules, herein adopted.⁸⁴ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁸⁵ In addition, the term "small business" has the same meaning as the term "small business concern" under section 3 of the Small Business Act.⁸⁶ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.⁸⁷

The Commission has not developed a definition of small entities applicable to Radio Frequency Equipment Manufacturers (RF Manufacturers). Therefore, the applicable definition of small entity is the definition under the SBA rules applicable to manufacturers of "Radio and Television Broadcasting and Communications Equipment." According to the SBA's regulation, an RF manufacturer must have 750 or fewer employees in order to qualify as a small business.⁸⁸ Census Bureau data indicates that there are 858 companies in the United States that manufacture radio and television broadcasting and communications equipment, and that 778 of these firms have fewer than 750 employees and would be classified as small entities.⁸⁹ We believe that many of the companies that manufacture RF equipment may qualify as small entities.

D. Description of Projected Reporting, Recordkeeping and Other Compliance Requirements.

Although a large number of Part 15 and Part 18 radio frequency devices are already required to be authorized under the Commission's Certification, Declaration of Conformity, or Verification procedures as a prerequisite to marketing and importation, the adopted rules add a slight amount of new testing and reporting requirements, as explained below:

(a) Microwave ovens are already subject to radiated emission limits in the existing rules.⁹⁰ The adopted rules would require microwave ovens and consumer ISM equipment (other than RF lights, induction ranges and ultrasonic equipment) to comply with conducted emission limits.⁹¹

(b) Induction ranges and ultrasonic equipment are already subject to Part 18 conducted emission limits, but with the adopted rules, the low frequency range now starts at 9 kHz instead of the previous 10

⁸⁴ See 5 U.S.C. §§ 603(b)(3) and 604(a)(3).

⁸⁵ See 5 U.S.C. § 601(6).

⁸⁶ See 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

⁸⁷ See 15 U.S.C. § 632 (1996).

⁸⁸ See 13 C.F.R. § 121.201, Standard Industrial Classification (SIC) Code 3663. See also the North American Industry Classification System Codes (NAICS) Code 334220.

⁸⁹ See U.S. Department of Commerce, 1992 Census of Transportation, Communications and Utilities (issued May 1995), SIC category 3663. See also the North American Industry Classification System Codes (NAICS) Code 334220.

⁹⁰ See 47 CFR § 18.305.

⁹¹ See 47 CFR § 18.307. See also, the discussion in ¶ 22.

kHz.⁹²

(c) Under the adopted rules, measurements for conducted emissions must be made with instrumentation containing both a quasi-peak and an average reading detector.⁹³

(d) Under the adopted rules, conducted emissions from Part 15 equipment must be measured down to 150 kHz instead of the previous 450 kHz, and measurements must be made with instrumentation containing both a quasi-peak and an average reading detector as well.⁹⁴

This slightly increased amount of testing is not a significant burden and will be offset by economies of scale, because harmonization of requirements will allow the same product to be manufactured and marketed without modifications in several countries, thus reducing costs. Furthermore, most Part 15 equipment manufacturers already have the option to either comply with CISPR 22 limits or the FCC limits. The adoption of a single set of limits would simplify compliance with the requirements. The harmonization of our rules with international standards will reduce costs for all manufacturers, but it is particularly beneficial to small business entities that will not have to continue to maintain separate product lines in order to ensure their compliance with region- or country-specific regulatory requirements.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.⁹⁵

The Commission is modifying its rules to harmonize with the international standards developed by the IEC/CISPR. Harmonized requirements improve economies of scale by allowing the same product design to be manufactured without modifications for sale in various countries and thereby reduce costs for products marketed internationally by small businesses. Harmonization of mandatory standards will further benefit small business entities by allowing them to make better use of human and financial resources currently dedicated to maintaining regulatory compliance for products intended for export to separate countries.

The Commission originally proposed, in the *Notice*, a transition period under which the regulations adopted in this proceeding would become effective, for all entities subject to the adopted rules, one year from the date of publication of a Report and Order in the Federal Register, for all Part 15 and 18 devices subsequently authorized under a grant of Certification, a Declaration of Conformity, or Verification. However, to reduce the burden on small entities within the field of entities subject to the rules, we are adopting a longer transition period, up to two years, for new products, and a transition period of three years for all existing products that continue to be manufactured or imported.⁹⁶

⁹² See discussion in ¶ 23.

⁹³ See discussion in ¶¶ 12 and 18.

⁹⁴ See discussion in ¶¶ 20-21.

⁹⁵ See 5 U.S.C. § 603(c)(1)-(c)(4).

⁹⁶ See discussion in ¶¶ 24-25.

F. Report to Congress

The Commission will send a copy of the *Report and Order*, including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act.⁹⁷ In addition, the Commission will send a copy of the *Report and Order*, including this FRFA, to the Chief Counsel for Advocacy of the Small Business Administration. A copy of the *Report and Order* and FRFA (or summaries thereof) will also be published in the Federal Register.⁹⁸

⁹⁷ See 5 U.S.C. § 801(a)(1)(A).

⁹⁸ See 5 U.S.C. § 604(b).

**APPENDIX B
LIST OF COMMENTING PARTIES**

Comments were filed by:

1. Adaptive Networks, Inc. (Adaptive)
2. American National Standards Institute, Inc., Accredited Standards Committee C63 (C63)
3. American Radio Relay League (ARRL)
4. Association of Home Appliance Manufacturers (AHAM)
5. Consumer Electronics Association (CEA)
6. Information Technology Industry Council (ITI)
7. Intel Corporation (Intel)
8. International Microwave Power Institute (IMPI)
9. Lucent Technologies Inc. (Lucent)
10. Microsoft Corporation (Microsoft)
11. National Association of Broadcasters (NAB)

Reply comments were filed by:

1. Adaptive Networks, Inc. (Adaptive)
2. ARRL: The National Association for Amateur Radio (ARRL)
3. Fusion Lighting, Inc. (Fusion)
4. International Microwave Power Institute (IMPI)
5. Microsoft Corporation (Microsoft)
6. National Association of Broadcasters (NAB)
7. U.S. Department of Transportation (DOT)

APPENDIX C FINAL RULES

For the reasons set forth above, Parts 15 and 18 of Title 47 of the Code of Federal Regulations are amended as follows:

A. Title 47 of the Code of Federal Regulations, Part 15, is amended as follows:

1. The authority citation for Part 15 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302, 303, 304, 307 and 544A.

2. Section 15.37 is amended by adding paragraph (j), to read as follows:

§ 15.37 Transition provisions for compliance with the rules.

* * * * *

(j) All radio frequency devices that are authorized under the certification, verification or declaration of conformity procedures on or after *[insert date 2 years from date of publication in the Federal Register]* shall comply with the conducted limits specified in § 15.107 or § 15.207 of this Part, as appropriate. All radio frequency devices that are manufactured or imported on or after *[insert date 3 years from date of publication in the Federal Register]* shall comply with the conducted limits specified in § 15.107 or § 15.207 of this Part, as appropriate. Equipment authorized, imported or manufactured prior to these dates shall comply with the conducted limits specified in § 15.107 or § 15.207 of this Part, as appropriate, or with the conducted limits that were in effect immediately prior to *[insert date 60 days from date of publication in the Federal Register]*.

* * * * *

3. Section 15.107 is amended by revising paragraphs (a), (b), and (c)(2), by removing paragraphs (d) and (e) and by redesignating paragraph (f) as paragraph (d), to read as follows:

§ 15.107 Conducted limits.

(a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as

measured using a 50 μ H/50 ohms LISN. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	79	66
0.5-30	73	60

(c) * * * * *

(2) For all other carrier current systems: 1000 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/50 ohms LISN.

* * * * *

4. Section 15.207 is amended by revising paragraph (a), and (c)(2), by removing paragraph (b), and by redesignating paragraphs (c) and (d) as (b) and (c), respectively, to read as follows:

§ 15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) * * * * *

(2) For all other carrier current systems: 1000 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/50 ohms LISN.

* * * * *

B. Title 47 of the Code of Federal Regulations, Part 18, is amended as follows:

1. The authority citation for Part 18 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 301, 302, 303, 304, 307.

2. Section 18.123 is added, to read as follows:

§ 18.123 Transition provisions for compliance with the rules.

Consumer ISM devices, induction cooking ranges and ultrasonic equipment that are authorized under the certification, verification or declaration of conformity procedures on or after *(insert date 2 years from date of publication in the Federal Register)* shall comply with the conducted limits specified in § 18.307 of this Part. All such devices that are manufactured or imported on or after *(insert date 3 years from date of publication in the Federal Register)* shall comply with the conducted limits specified in § 18.307 of this Part. Equipment authorized, imported or manufactured prior to these dates shall comply with the conducted limits specified in § 18.307 of this Part or with the conducted limits that were in effect immediately prior to *(insert date 60 days from date of publication in the Federal Register)*.

* * * * *

3. Section 18.307 is amended by revising the introductory paragraph, paragraphs (a) and (b), removing the Notes section and adding paragraphs (d) through (g) to read as follows:

§ 18.307 Conducted limits.

For the following equipment, when designed to be connected to the public utility (AC) power line the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies shall not exceed the limits in the following tables. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal using a 50 μ H/50 ohms line impedance stabilization network (LISN).

(a) All Induction cooking ranges and ultrasonic equipment:

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.009-0.05	110	-
0.05-0.15	90-80	-
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) All other Part 18 consumer devices:

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

* * * * *

- (d) If testing with a quasi-peak detector demonstrates that the equipment complies with the average limits specified in the appropriate table in this section, additional testing to demonstrate compliance using an average detector is not required.
- (e) These conduction limits shall apply only outside of the frequency bands specified in § 18.301 of this chapter.
- (f) For ultrasonic equipment, compliance with the conducted limits shall preclude the need to show compliance with the field strength limits below 30 MHz unless requested by the Commission.
- (g) The tighter limits shall apply at the boundary between two frequency ranges.